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LBNL Information regarding Potential Radiation Dose in the Event of a Fire at the National Tritium Labeling Facility

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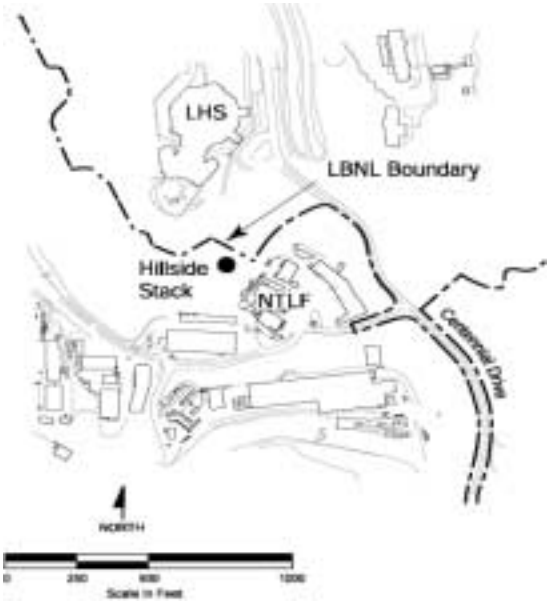
In the second draft IFEU report "Review of Radiological Monitoring at LBNL," a concern was expressed that the potential worst-case radiation dose from a fire at the NTLF could be much higher than reported in the 1995 LBNL Safety Analysis Document (SAD) for the facility. A comprehensive list of possible accident scenarios was analyzed in the SAD. The scenarios included tritium releases due to accidents during storage and handling of tritium, and from natural disasters (e.g., fire & earthquakes). In all cases, the projected "worst case" public radiation doses were far less than applicable standards. **The analysis of catastrophic accidents from a fire or seismic/landslide event showed that the accidental releases of tritium inventory could not cause significant localized consequences.**

The items below were concerns expressed about this issue in the IFEU report and by the public. The Lab's responses follow each comment.

- *The entire inventory of tritium could be released through the ventilation system and the hillside stack.*

The 1995 SAD concluded that a fire could not send the tritium inventory out through the stack. At 1100^{o} F the tritium would slowly begin to permeate through the steel containment system, and oxidize from gaseous tritium (HT) to tritium vapor (HTO). Such temperatures could result from a wildland fire, such as the Oakland Hills Firestorm, or, at least, a fully involved fire in the lab that would be powerful enough to disable the sprinkler system and that would be unable to be contained by the LBNL Fire Department, 5 minutes away.



Berkeley Lab Site

Smoke and fire would overwhelm and disable the ventilation system and the smoke (and tritium) would exit the building, not the hillside stack. The heat of the fire would carry the tritium to a height of approximately 100 feet and disperse it widely before it reached the site boundary. This model was presented in the SAD and approved by DOE.

Note: The stack will soon be moved to the NTLF building. When that occurs, the release point will be the building, whether or not the ventilation system remains operable.

- *SENES Inc. modeled a 218 millicurie release from the stack, resulting in a 0.042 to 0.26 millirem dose to a jogger at the fenceline. If this release is factored up to 15,000 Curies, the entire NTLF inventory, the dose range is 2900 to 18,000 millirem. This is substantially more than the SAD dose.*

SENES modeled a "puff" or very short-term (15 minute) release of normal effluents from the hillside stack, near the site boundary. SENES has stated that this model is not appropriate for a fire release.

A major fire is the only way that all the tritium could be released. Per discussion above, the SAD concluded that the release would be via an elevated fire plume from the building, farther from a member of the public at the fenceline, and the tritium would be much more diluted, causing a much lower dose.

- *An independent assessment of accidents is recommended.*

DOE Headquarters reviewed and approved the SAD in 1995. As part of the Berkeley Lab project to relocate the hillside stack later this year, an independent fire accident analysis and dose assessment will be performed by an external contractor.

- *A high-risk fire zone exists in the area. Other LBNL facilities could add to public exposure in the event of a fire.*

LBNL is located in an area at risk from a wildland fire. Mitigation efforts such as vegetation management and emergency planning taken as a result of the Oakland Hills Fire have reduced this risk substantially. If a wildland fire were to take place that involved the NTLF, the fire plume would rise much higher than modeled in the SAD. In the 1991 firestorm the fire plume was measured at over 1000 feet. This would cause much greater dispersion and a resulting lower radiation dose. At another LBNL building, the Hazardous Waste Handling (HWHF), its SAD modeled the maximum dose due to tritium from a wildland fire, calculated at less than 1 millirem. Even if both facilities were consumed in a wildland fire the radiation dose consequences would be very small.

- *The high dose postulated by IFEU from a fire release is orders of magnitude higher than the EPA limit for dose from air emissions (10 millirem).*

The high dose postulated by IFEU is based upon flawed assumptions (release from the hillside stack), as pointed out above. The EPA limit applies to actual emissions, not to worst-case accident analysis models of potential emissions. Both NRC and EPA, for instance, have guidance that requires emergency planning if potential offsite doses from accidents exceed 1000 to 5000 millirem. The doses calculated in the SAD were far below these values.